

WE CLAIM:

1 1. A composition comprising:
2 a combination of non-ionic emulsifiers with anionic emulsifiers comprising a
3 media sufficiently acidic to initiate acid reactive polymerization, wherein
4 (of what)
 said anionic emulsifiers are selected from the group consisting of alkane sulfates,
5 alkane sulfonates, and phosphate esters; and,
6 said non-ionic emulsifiers comprise polyoxyethylene alcohols.

1 2. The composition of claim 1 wherein
2 said anionic emulsifiers comprise from about 8 to about 18 carbon atoms; and
3 said polyoxyethylene alcohols comprise from about 8 to about 30 carbon atoms
4 and from about 3 to about 50 moles ethylene oxide.
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1 3. The composition of claim 1 wherein said polyoxyethylene alcohols
2 comprise from about 13 to about 15 carbon atoms.

1 4. The composition of claim 1 wherein said polyoxyethylene alcohols
2 comprise from about 3 to about 20 moles ethylene oxide.

1 5. The composition of claim 2 wherein said polyoxyethylene alcohols
2 comprise from about 3 to about 20 moles ethylene oxide.

1 6. The composition of claim 3 wherein said polyoxyethylene alcohols
2 comprise from about 3 to about 20 moles ethylene oxide.

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1 7. The composition of claim 1 wherein said polyoxyethylene alcohols are
2 selected from the group consisting essentially of linear polyoxyethylene alcohols,
3 polyoxyethylene alcohols comprising about 10 moles ethylene oxide, and a combination
4 thereof.

1 8. The composition of claim 2 wherein said polyoxyethylene alcohols are
2 selected from the group consisting essentially of linear polyoxyethylene alcohols,
3 polyoxyethylene alcohols comprising about 10 moles ethylene oxide, and a combination
4 thereof.

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C' 1 9. The composition of claim 3 wherein said polyoxyethylene alcohols are
2 selected from the group consisting essentially of linear polyoxyethylene alcohols,
3 polyoxyethylene alcohols comprising about 10 moles ethylene oxide, and a combination
4 thereof.

1 10. The composition of claim 1 wherein said combination comprises a blend
2 of non-ionic emulsifier and anionic emulsifier at a ratio of about 50/50 to about 85/15.

1 11. The composition of claim 2 wherein said combination comprises a blend
2 of non-ionic emulsifier and anionic emulsifier at a ratio of about 50/50 to about 85/15.

1 12. The composition of claim 4 wherein said combination comprises a blend
2 of non-ionic emulsifier and anionic emulsifier at a ratio of about 50/50 to about 85/15.

1 13. . . The composition of claim 5 wherein said combination comprises a blend
2 of non-ionic emulsifier and anionic emulsifier at a ratio of about 50/50 to about 85/15.

1 14. . . The composition of claim 6 wherein said combination comprises a blend
2 of non-ionic emulsifier and anionic emulsifier at a ratio of about 50/50 to about 85/15.

1 15. . . The composition of claim 9 wherein said combination comprises a blend
2 of non-ionic emulsifier and anionic emulsifier at a ratio of about 50/50 to about 85/15.

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1 16. . . The composition of claim 1 wherein said media has a pH of about 1 or
2 less.

1 17. . . The composition of claim 2 wherein said media has a pH of about 1 or
2 less.

1 18. . . The composition of claim 4 wherein said media has a pH of about 1 or
2 less.

1 19. . . The composition of claim 5 wherein said media has a pH of about 1 or
2 less.

1 20. . . The composition of claim 6 wherein said media has a pH of about 1 or
2 less.

1 21. The composition of claim 7 wherein said media has a pH of about 1 or
2 less.

1 22. The composition of claim 8 wherein said media has a pH of about 1 or
2 less.

1 23. The composition of claim 9 wherein said media has a pH of about 1 or
2 less.

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1 24. The composition of claim 15 wherein said media ahs a pH of about 1 or
2 less.

1 25. The composition of claim 1 wherein said alkane sulfates, alkane
2 sulfonates, and phosphate esters comprise from about 8 to about 12 carbon atoms.

1 26. The composition of claim 3 wherein said alkane sulfates, alkane
2 sulfonates, and phosphate esters comprise from about 8 to about 12 carbon atoms.

1 27. The composition of claim 4 wherein said alkane sulfates, alkane
2 sulfonates, and phosphate esters comprise from about 8 to about 12 carbon atoms.

1 28. The composition of claim 6 wherein said alkane sulfates, alkane
2 sulfonates, and phosphate esters comprise from about 8 to about 12 carbon atoms.

1 29. The composition of claim 10 comprising about 10 wt.% or less of said
2 combination of non-ionic emulsifiers with anionic emulsifiers.

1 30. A composition comprising:
2 an emulsion comprising droplets comprising free hydrocarbons emulsified by a
3 combination of non-ionic emulsifiers with anionic emulsifiers comprising
4 a media sufficiently acidic to initiate acid reactive polymerization,
5 wherein said anionic emulsifiers are selected from the group consisting of alkane
6 sulfates, alkane sulfonates, and phosphate esters; and,
7 said non-ionic emulsifiers comprise polyoxyethylene alcohols.

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1 31. The composition of claim 30 wherein
2 said polyoxyethylene alcohols comprise from about 8 to about 18 carbon atoms;
3 and,
4 said polyoxyethylene alcohols comprise from about 8 to about 30 carbon atoms
5 and from about 3 to about 50 moles ethylene oxide.

1 32. The composition of claim 30 wherein said polyoxyethylene alcohols
2 comprise from about 13 to about 15 carbon atoms.

1 33. The composition of claim 32 wherein said polyoxyethylene alcohols
2 comprise from about 3 to about 20 moles ethylene oxide.

1 34. The composition of claim 32 wherein said polyoxyethylene alcohols are
2 selected from the group consisting essentially of linear polyoxyethylene alcohols,
3 polyoxyethylene alcohols comprising about 10 moles ethylene oxide, and a combination
4 thereof.

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1 35. The composition of claim 30 wherein said media has a pH of about 1 or
2 less.

1 36. The composition of claim 34 wherein said media has a pH of about 1 or
2 less.

1 37. The composition of claim 30 wherein said droplets are encapsulated by an
2 encapsulating material.

1 38. The composition of claim 32 wherein droplets are encapsulated by an
2 encapsulating material.

1 39. The composition of claim 34 wherein said droplets are encapsulated by an
2 encapsulating material.

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1 40. The composition of claim 37 wherein said encapsulating material is a
2 silicate.

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1 41. The composition of claim 38 wherein said encapsulating material is a
2 silicate.

1 42. The composition of claim 39 wherein said encapsulating material is a
2 silicate.

1 43. A composition comprising:
2 drill cuttings; and,
3 an emulsion comprising droplets comprising free hydrocarbons emulsified by a
4 combination of non-ionic emulsifiers with anionic emulsifiers in a media
5 sufficiently acidic to initiate acid reactive polymerization,
6 wherein said anionic emulsifiers are selected from the group consisting of alkane
7 Sulfates, alkane sulfonates, and phosphate esters; and,
8 said non-ionic emulsifiers comprise polyoxyethylene alcohols.

1 44. The composition of claim 43 wherein
2 said polyoxyethylene alcohols comprise from about 8 to about 18 carbon atoms;
3 and
4 said polyoxyethylene alcohols comprise from about 8 to about 30 carbon atoms
5 and from about 3 to about 50 moles ethylene oxide.

1 45. The composition of claim 44 wherein said polyoxyethylene alcohols
2 comprise from about 13 to about 15 carbon atoms.

1 46. The composition of claim 45 wherein said polyoxyethylene alcohols are
2 selected from the group consisting essentially of linear polyoxyethylene alcohols,
3 polyoxyethylene alcohols comprising about 10 moles ethylene oxide, and a combination
4 thereof.

1 47. The composition of claim 43 wherein said media has a pH of about 1 or
2 less.

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CJ 1 48. The composition of claim 45 wherein said media has a pH of about 1 or
2 less.

1 49. The composition of claim 47 wherein said droplets have a diameter of
2 from about 3 microns to about 20 microns.

1 50. The composition of claim 49 wherein said droplets have a diameter of
2 about 10 microns or less.

1 51. The composition of claim 48 wherein said droplets have a diameter of
2 from about 3 microns to about 20 microns.

1 52. The composition of claim 51 wherein said droplets have a diameter of
2 about 10 microns or less.

1 53. The composition of claim 43 wherein said droplets are encapsulated by an
2 encapsulating material.

1 54. The composition of claim 44 wherein droplets are encapsulated by an
2 encapsulating material.

1 55. The composition of claim 45 wherein said emulsion comprises droplets
2 encapsulated by an encapsulating material.

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1 56. The composition of claim 51 wherein said droplets are encapsulated by an
2 encapsulating material.

1 57. The composition of claim 52 wherein said droplets are encapsulated by an
2 encapsulating material.

1 58. The composition of claim 53 wherein said encapsulating material is a
2 silicate.

1 59. The composition of claim 54 wherein said encapsulating material is a
2 silicate.

1 60. The composition of claim 55 wherein said encapsulating material is a
2 silicate.

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1 61. The composition of claim 56 wherein said encapsulating material is a
2 silicate.

1 62. The composition of claim 57 wherein said encapsulating material is a
2 silicate.

1 63. A composition comprising:
2 droplets comprising free hydrocarbons and emulsifier selected from the group
3 consisting of non-ionic emulsifiers, anionic emulsifiers, and a
4 combination thereof, said droplets being encapsulated by an
5 encapsulating material;
6 wherein said anionic emulsifiers are selected from the group consisting of alkane
7 sulfates, alkane sulfonates, and phosphate esters; and,
8 said non-ionic emulsifiers comprise polyoxyethylene alcohols.

1 64. The composition of claim 63 wherein
2 said anionic emulsifiers comprise from about 8 to about 18 carbon atoms; and
3 said polyoxyethylene alcohols comprise from about 8 to about 30 carbon atoms
4 and from about 3 to about 50 moles ethylene oxide.

1 65. The composition of claim 63 wherein said polyoxyethylene alcohols
2 comprise from about 13 to about 15 carbon atoms.

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1 66. The composition of claim 64 wherein said polyoxyethylene alcohols
2 comprise from about 3 to about 20 moles ethylene oxide.

1 67. The composition of claim 65 wherein said polyoxyethylene alcohols
2 comprise from about 3 to about 20 moles ethylene oxide.

1 68. The composition of claim 63 wherein said polyoxyethylene alcohols are
2 selected from the group consisting essentially of linear polyoxyethylene alcohols,
3 polyoxyethylene alcohols comprising about 10 moles ethylene oxide, and a combination
4 thereof.

1 69. The composition of claim 65 wherein said polyoxyethylene alcohols are
2 selected from the group consisting essentially of linear polyoxyethylene alcohols,
3 polyoxyethylene alcohols comprising about 10 moles ethylene oxide, and a combination
4 thereof.

1 70. The composition of claim 63 wherein said combination comprises a blend
2 of non-ionic emulsifier and anionic emulsifier at a ratio of about 50/50 to about 85/15.

1 71. The composition of claim 67 wherein said combination comprises a blend
2 of non-ionic emulsifier and anionic emulsifier at a ratio of about 50/50 to about 85/15.

1 72. The composition of claim 63 comprising a pH of about 4 or less.

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1 73. The composition of claim 67 comprising a pH of about 4 or less.

1 74. A composition comprising droplets comprising free hydrocarbons, said
2 droplets having a diameter of from about 3 microns to about 20 microns and being
3 encapsulated by an encapsulating material.

1 75. The composition of claim 74 wherein said encapsulating material is a
2 silicate.

1 76. The composition of claim 75 further comprising drill cuttings.

1 77. A composition comprising a droplets comprising a quantity of free
2 hydrocarbons, said droplets being encapsulated by an encapsulating material effective to
3 maintain a leachate of about 0.5% or less of said quantity of free hydrocarbons.

1 78. The composition of claim 77 wherein said leachate is about 0.25% or less
2 of said quantity of free hydrocarbons.

1 79. The composition of claim 77 wherein said leachate is about 0.05% or less
2 of said quantity of free hydrocarbons.

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